

DR1040

Shielded power inductors



Description

- Shielded drum core
- Inductance range from 1.4 μ H to 323 μ H
- Current range from 0.52 A to 10 A
- 10.5 mm x 10.3 mm footprint surface mount package in a 4.0 mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

Applications

- LED/LCD backlighting
- High definition televisions (HDTV)
- Server and desktop power supplies
- Portable electronics
- Graphics cards and battery powered systems
- Point-of-load (POL) modules
- Printers and peripherals

Environmental Data

- Storage temperature range (Component):
 - -40 °C to +125 °C
- Operating temperature range: -40 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant



Product Specifications

Part Number ⁵	OCL ¹ (μH) ±30%	I _{rms} ² (A)	I _{sat} ² (A)	DCR (mΩ) typical @ 20°C	DCR (mΩ) maximum @ 20°C	K-factor ⁴
DR1040-1R5-R	1.35	6.5	10	6.0	8.1	15.5
DR1040-2R5-R	2.4	6.1	7.8	7.0	9.0	12.0
DR1040-3R8-R	3.6	5.5	6.4	9.6	13	9.9
DR1040-5R2-R	5.2	5.4	5.5	14	17	8.3
DR1040-7R0-R	6.8	4.5	4.8	17	20	7.2
DR1040-8R2-R	8.1	3.98	4.6	24	29	6.4
DR1040-100-R	9.6	3.8	4.4	26	35	5.7
DR1040-150-R	14.9	3.1	3.6	37	50	4.7
DR1040-220-R	21.1 ±20%	2.5	2.9	54	73	4.0
DR1040-330-R	32.6	2.2	2.45	69	93	3.3
DR1040-470-R	45.8	1.9	2.1	95	128	2.8
DR1040-680-R	65.3	1.42	1.65	152	183	2.3
DR1040-820-R	87	1.29	1.47	214	260	2.0
DR1040-101-R	101	1.25	1.35	225	304	1.9
DR1040-151-R	148	0.85	1.15	356	430	1.6
DR1040-221-R	216	0.70	0.92	530	640	1.3
DR1040-331-R	323	0.52	0.70	810	1090	1.0

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 Vrms, 0.0 Adc, +25 °C

2. I_{rms}: DC current for an approximate temperature rise of 30 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 125 °C under worst case operating conditions verified in the end application.

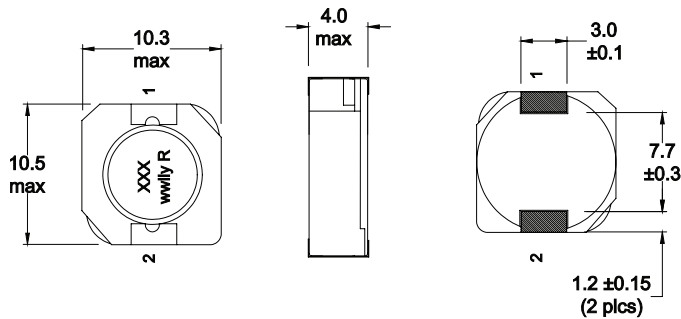
3. I_{sat}: Peak current for approximately 35% rolloff @ +25 °C

4. K-factor: K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K * L * ΔI. Bp-p: (mT), K: (K-factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).

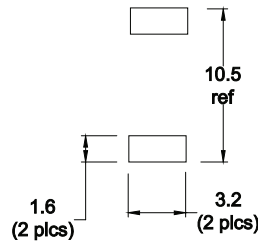
5. Part Number Definition: DR1040-xxx-R

DR1040 = Product code and size
-xxx= inductance value in μH, R= decimal point,
If no R is present then last character equals number of zeros
-R suffix = RoHS compliant

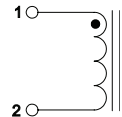
Dimensions (mm)



Recommended Pad Layout



Schematic



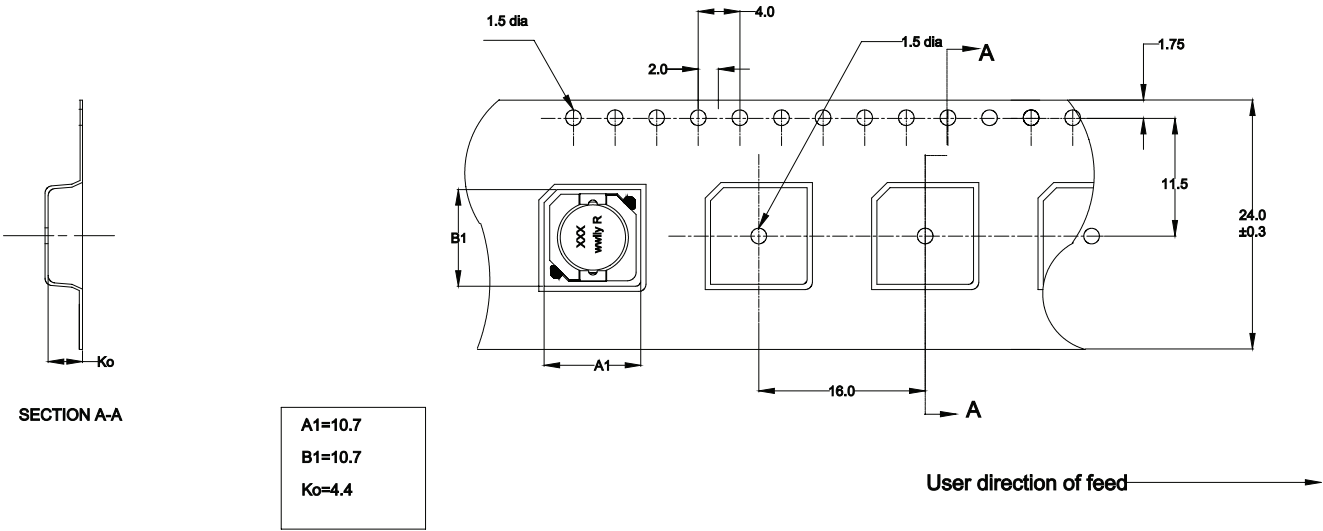
Part marking: inductance value in uH. R = decimal point. If no R is present then last character equals number of zeroes.

wwlly = date code, R = revision level

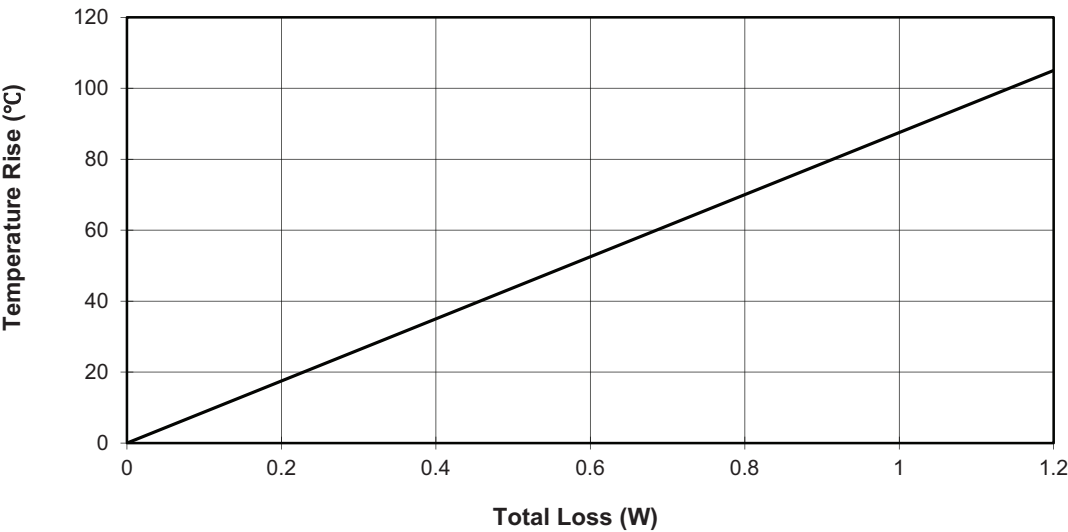
Do not route traces or vias underneath the inductor

Packaging information (mm)

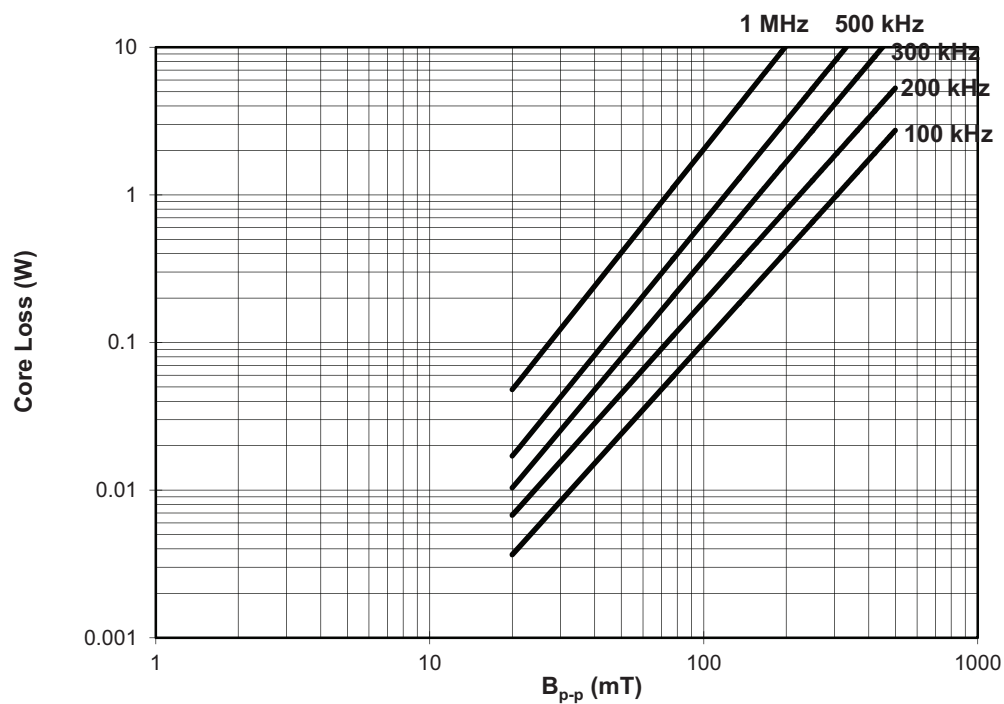
Supplied in tape and reel packaging , 850 parts per 13" diameter reel



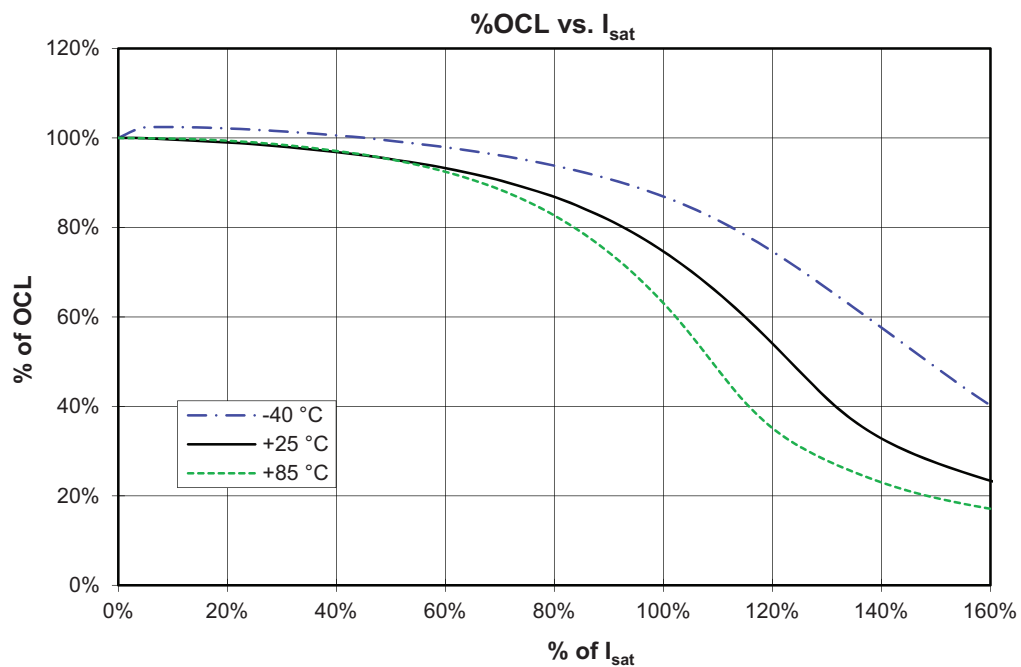
Temperature rise vs. total loss



Core loss vs. B_{p-p}



Inductance characteristics



Solder reflow profile

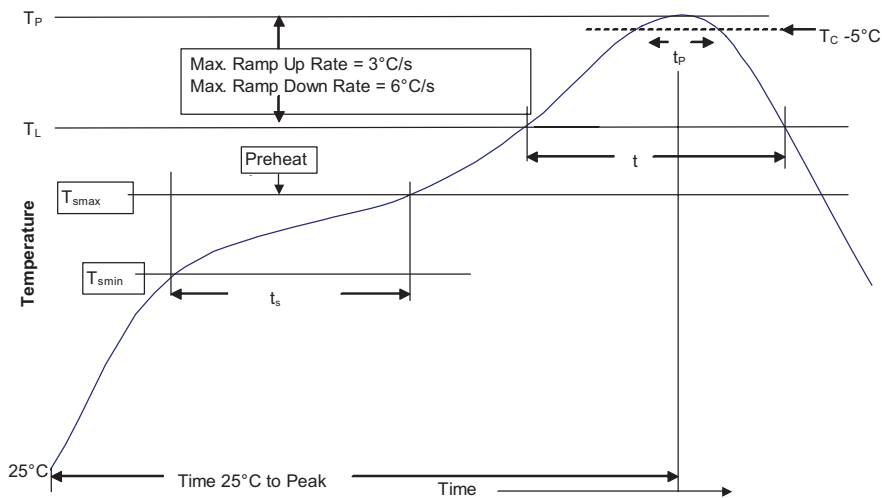


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm)	235°C	220°C
≥2.5mm	220°C	220°C

Table 2 - Lead (Pb) Free Solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350 - 2000	Volume mm ³ >2000
<1.6mm	260°C	260°C	260°C
1.6 – 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

Reference JEDEC J-STD-020D

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak		
• Temperature min. (T_{smin})	100°C	150°C
• Temperature max. (T_{smax})	150°C	200°C
• Time (T_{smin} to T_{smax}) (t_s)	60-120 Seconds	60-120 Seconds
Average ramp up rate T_{smax} to T_P	3°C/ Second Max.	3°C/ Second Max.
Liquidous temperature (T_L)	183°C	217°C
Time at liquidous (t_L)	60-150 Seconds	60-150 Seconds
Peak package body temperature (T_P)*	Table 1	Table 2
Time (t_p)** within 5 °C of the specified classification temperature (T_C)	20 Seconds**	30 Seconds**
Average ramp-down rate (T_P to T_{smax})	6°C/ Second Max.	6°C/ Second Max.
Time 25°C to Peak Temperature	6 Minutes Max.	8 Minutes Max.

* Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum.

** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

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